

First find of 4H SiC polytype *in situ* in volcanic rocks of northern Israel

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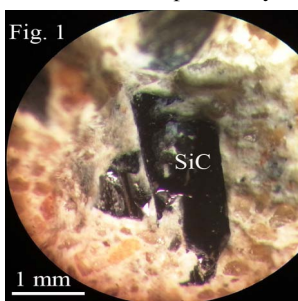
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Moissanite (SiC), a high-pressure mineral of mantle origin, is a window into the oxygen deficiency processes in the deep Earth. There are also inexplicable reports of SiC in mineral separates from granites and other shallow rocks, and it should be revisited with obtaining SiC *in situ*. One of the newest and poor understood occurrences of abundant SiC is Carmel Mount and Qishon River Valley, Israel [1]. We present here Raman spectroscopy and electron microscopy studies of SiC occurred *in situ* in tuff, Fig.1. The sample was collected from the debris slope at 30~50 m distance from basalt outcrop (N32°40'19.9" E35°17'22.4") at the Yizre'el Valley, of Qishon River. The tuff is a part of the Miocene basaltic volcanism [2] linked to tectono-thermal activation of this area [3]. The Raman spectrum (514.5 nm laser light) exhibits first-order peaks (cm⁻¹) at 797.6 (TO) and 967.2 (LO), and secondary peaks at 610.5 (A1), 266.3 (E1), and 195.4 (E2) confirming a hexagonal structure, and presence of 4H SiC polytype. The FIB foils prepared from the same sample were studied with TEM, and revealed hexagonal (P63mc) symmetry with unit cells: $a=3.073\text{\AA}$ and $c=10.053\text{\AA}$ confirming the 4H SiC polytype. The 6H SiC was earlier detected in Haifa Technion Lab in samples from the same area. The 4H polytype is very rare within the terrestrial SiC; it was described as extremely small domains within epitaxially intergrown 6H and 15R polytypes



of SiC inclusions in Fuxin diamonds [4]. Mantle origin of 4H SiC and redox conditions in significantly larger volume of lithosphere than it was thought before are also in the focus of this contribution.

[1] Levin & Kolmanovich (2006), *GSI*, **75**. [2] (Sheh *et al.* (1998), *Geol. Map of Israel*. [3] Chang & van der Lee (2011), *EPSL*, **302**, 448-454. [4] Leung (1990), *Am.Min.*, **75**, 1110-1119.